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Citrus Variety Trends

in the Lower Rio Grande Valley

The TEXAS AGRICULTURAL AND MECHANICAL COLLEGE SYSTEM
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CONTENTS

DIGEST

The severe freeze of January 1951 destroyed thousands of citrus trees and the growers were faced with a tremendous replanting program, which, in turn, had focused interest on varieties.

Fruit production figures, yields per acre, and monetary returns per acre for five varieties of grapefruit and five varieties of oranges covering the 10-year period, 1940-50, were computed to give the citrus growers and others interested some idea of the relative value of each variety during this period.

Marsh Pink grapefruit produced the highest average yield and the highest average return per acre—410 boxes and $623.20, respectively. Ruby Red grapefruit brought $2.16 per box, which was the highest for all varieties. The Valencia orange was next with an average return per box of $1.94. Marsh White grapefruit led in total production, followed by Marsh Pink and Valencia orange.

Production per acre for all grapefruit and all oranges increased appreciably from 1940 to 1950. The percentage of total production of pink and red-meated grapefruit to reach the fresh market increased during this period, while it decreased for white-meated grapefruit.

Table 1. Ten-year average of production records and monetary returns for 10 varieties of citrus, 1940-50

Variety	Varietal ratio in percent	Average yearly juice production, 1 3/5 bu. boxes	Average yearly fresh production, 1 3/5 bu. boxes	Average yearly total production, 1 3/5 bu. boxes	Average return per box in dollars[1]	Average production per acre in boxes	Average return per acre in dollars
			Grapefruit				
Marsh White	71.6 Fresh 84.4 Juice	6,091,823	7,281,863	13,373,686	1.08	366	395.28
Marsh Pink	16.4 Fresh 7.4 Juice	534,117	1,667,913	2,202,030	1.52	410	623.20
Foster Pink	6.9 Fresh 3.4 Juice	245,405	701,744	947,149	1.62	337	545.94
Ruby Red	4.9 Fresh 2.2 Juice	158,792	498,340	657,132	2.16	135	291.60
Duncan	.2 Fresh 2.6 Juice	187,663	20,340	208,003	.78	310	241.80
Total	100.0 Fresh 100.0 Juice	7,217,800	10,170,200	17,388,000			
			Oranges				
Hamlin	27.8 Fresh 25.3 Juice	136,190	885,736	1,021,926	1.36	259	352.24
Pineapple	24.3 Fresh 25.1 Juice	135,113	774,222	909,335	1.32	326	430.32
Navel	8.5 Fresh 8.7 Juice	46,833	270,819	317,652	1.74	173	301.02
Temple	4.7 Fresh 4.8 Juice	25,838	149,747	175,585	1.64	198	324.72
Valencia	34.7 Fresh 36.1 Juice	194,326	1,105,576	1,299,902	1.94	300	582.00
Total	100.0 Fresh 100.0 Juice	538,300	3,186,100	3,724,400			

[1]Weighted average.

Citrus Variety Trends in the Lower Rio Grande Valley

D. C. ALDERMAN, Associate Horticulturist
Lower Rio Grande Valley Experiment Station, Weslaco, Texas

CONSUMERS FOR THE MOST PART are not concerned about the differences among varieties of citrus fruits. The citrus producer, however, is constantly on the lookout for new and better kinds which may mean more money in his pocket. The severe freeze of January 1951, which destroyed hundreds of citrus orchards and seriously damaged many others in the Lower Rio Grande Valley, is focusing attention as never before on the variety question.

Soon after the freeze, growers, shippers, nurserymen and others concerned with the citrus industry, began considering which varieties should be replanted and in what proportion. The Lower Rio Grande Valley Experiment Station at Weslaco, in cooperation with the Texas Citrus Commission, therefore, has compiled information on variety trends and monetary returns over the past several years.

This study shows citrus varietal potentialities as revealed by the experience of the past 10 years. The picture of this period is the result of decisions made a quarter of a century ago regarding the kinds of citrus to plant and the number of trees of each variety to set out per acre. The citrus industry in the Valley is faced with virtually the same situation today. Growers will be replanting for themselves and for the future as well. Before extensive plantings are made, every factor which bears on the production and marketing of citrus should be carefully considered in relation to the variety problem.

MATERIALS AND METHODS

Information was obtained from the records of packing plants, canning companies, grove management concerns, nurseries, individual owners and from the Bureau of Agri-

clutural Economics, U. S. Department of Agriculture. Grapefruit varieties included were Marsh White, Marsh Pink, Foster Pink, Ruby Red and Duncan; orange varieties were Hamlin, Pineapple, Navel, Temple and Valencia.

The analysis of the information obtained pertaining to citrus varieties involved several steps; an explanation of the procedure follows. Available records were those of packing houses listing the quantity of fruit per variety packed for the fresh market. In addition, most of the packing plants included in their annual reports the average price per ton paid growers for each variety. The quantity of fruit processed in juice plants was presented only as total tons of grapefruit and oranges with no varietal breakdown. The number of packing plants furnishing annual production figures varied from 3 in some years to 11 in other years. The average sample size of this report was about 12 percent of the total Valley citrus production.

Before a varietal breakdown on production could be ascertained, it was necessary to arrive at some basis for computing the number of boxes of each variety processed. This was done by first calculating the ratio per year between the canned white and pink-meated grapefruit. It was then possible to estimate on a yearly basis the number of boxes of pink and red fruit and the number of boxes of white fruit which were made into juice. The next step was to calculate the number of boxes processed of the original sample for each variety. This was done in the following manner.

The 1 3/5 bushel box of grapefruit weighs 80 pounds and the 1 3/5 bushel box of oranges weighs 90 pounds. The 601,312 boxes of Marsh White of one plant in 1945 was 78.9 percent of its total fresh grapefruit pack. It delivered to the juice plant 330,339 boxes of which 14 percent was presumably composed of pink and red-fruited varieties, based on the ratio of canned white to pink juice for that year. Thus, 86 percent of the total, or 284,092 boxes, represented the quantity of white grapefruit processed. In this case, the number of boxes of Marsh White sold as fresh fruit represented 99.4 percent of the white grapefruit, fresh market pack. Therefore, if it is assumed that the same proportion prevailed between these two varieties on a processed basis, then it is possible to estimate the number of boxes of fruit canned for each variety.

The proportion of each variety within the sample to the total production of both canned and processed fruit was

determined by dividing the number of boxes of fresh or canned fruit of any given variety by the total production of oranges or grapefruit. The total fresh and processed production per variety for the Valley was computed by multiplying the varietal proportions by the yearly total of canned grapefruit and orange output and the yearly total of the fresh pack for oranges and grapefruit, respectively.

The return per box to the grower for each year was determined by averaging the figures given under this item by all the packing plants and other concerns listing grower prices.

Records on yields by variety were obtained from both grove-care concerns and individual orchard owners. Information on yields per tree was tabulated only if the number of trees per acre of any given variety was known. An average of 65 trees per acre was established from several reliable samples.

TEN-YEAR AVERAGE PRODUCTION

Grapefruit Production

The yearly relationship among varieties, based on 10-year production records and grower prices, is presented in Table 1. Marsh White grapefruit dominated the field in total volume of fruit produced, accounting for 71 percent of the fresh grapefruit and 84 percent of the processed grapefruit.

The Valley citrus industry had its origin at the close of World War I with the advent of land development companies featuring the production of citrus, particularly grapefruit. Thousands of acres of land were cleared between 1920 and 1930 and planted to Marsh White and Duncan grapefruit. The 1920 production of citrus in Texas, according to the Bureau of Agricultural Economics, USDA, was 3,000 boxes of grapefruit and 9,000 boxes of oranges. This crop was about one-tenth of 1 percent of the average Valley production for 1945-50. By 1930, total production reached 1,800,000 boxes of which 1,500,000 were grapefruit. Production reached 3,500,000 boxes in 1935-36. The following year, citrus output jumped to 11,000,000 boxes, a phenomenal increase of 7,500,000 boxes in a single year. The effect of the heavy Marsh White planting in the 1920's was beginning to make itself felt.

Grower interest in Marsh Pink began to assert itself during the middle 1930's and was responsible for the first

major change in varietal trends in grapefruit in the Valley. The first red sport of Marsh Pink was discovered in Florida in 1929, but extensive plantings were not made in the Lower Rio Grande Valley until 1938. These early plantings of red grapefruit were just coming into full production in 1949 when large numbers of these trees were either destroyed or seriously injured by the freeze. Statistics concerning production and return per acre for these red strains, therefore, pertain only to young trees and cannot be compared directly with other grapefruit varieties. (Red Ruby is used in this bulletin to denote all red strains of grapefruit.)

It is apparent that the predominance of Marsh White in the decade covered by this report is not necessarily an exact indication of the popularity of this variety, but rather a result of extremely heavy plantings when the Valley citrus industry was developing. At that time, the Marsh White was the best variety available.

Orange Production

The expansion of orange production in the Valley proceeded at a much slower pace than that of grapefruit. Peak production of 4,750,000 boxes was reached in 1947-48. The Valencia variety accounted for a third of the total orange output over the past 10 years, as shown in Table 1. The combined production of the two early varieties, Hamlin and Pineapple, amounted to 52 percent, and showed the popularity of early oranges. Navel and Temple oranges occupied positions of relatively minor importance, producing only about 8 and 5 percent of the total orange crop, respectively.

Return Per Box and Yield

The weighted average return per box for Ruby Red over a 7-year period was $2.16, as compared with the second-place position of Valencia oranges with a return of $1.94 per box over a 10-year period. Marsh White and Duncan grapefruit returned an average of $1.08 and $ .78 per box, respectively. Returns per box, however, have little meaning unless the production per tree is taken into consideration. Marsh Pink led the field with an average production of 410 boxes per acre, while the red strains of grapefruit were last with an average production of 135 boxes. Some allowance must be made, however, for the age differences of the trees from which production records were obtained. If the red grapefruit trees had reached full maturity, the average production per tree would undoubtedly have been larger. Navel oranges produced

173 boxes per acre to rank ninth, while Temple oranges were in eighth place with 198 boxes. It is probable that the low yields per acre of these two varieties, in spite of the rather high monetary return per box, have discouraged increased plantings.

Return Per Acre

The price per box multiplied by the yield in boxes per acre gives the dollar returns per acre. Marsh Pink was the third highest in the price per box and the highest in yield per acre. This variety brought the highest average return per acre, $623. Its nearest competitor was Valencia orange with an average of $582 per acre. Marsh White ranked fifth in return per acre, while Ruby Red, Duncan and Navel orange were at the bottom. Additional information on the returns per acre is given in Table 1.

Yearly Production Trends in Grapefruit

Yearly records from which Table 1 was compiled reveal some rather decisive facts concerning citrus variety trends in the Valley. For greater emphasis, this information is summarized graphically in Figures 1, 2, 3 and 4.

The return per acre in 1940 was low for all varieties. Returns reached a peak at the close of World War II, but dropped almost to prewar levels in 1948-49 and then started back up in 1949-50.

Figure 1 shows that Marsh Pink held the predominant position in return per acre, while Marsh White and Duncan began to drop in returns per acre in 1945-46, a season before the two pink varieties and two seasons before Ruby Red did.

The immaturity of Ruby Red trees was largely responsible for the low return per tree. However, in 1949, the year of the first damaging freeze, the return per tree for this variety had increased, while for the other varieties it had decreased. The 1949-50 tree-production records for Ruby Red were not available in sufficient numbers to justify their use because the freeze of January 30, 1949 killed or injured thousands of trees of this variety. There is as yet, however, no satisfactory evidence that this variety is less resistant to cold than other kinds of grapefruit.

Foster Pink displayed a definite tendency to heavy and light bearing in alternate years, as shown by its production curve in Figure 2. Alternate bearing is not a desirable

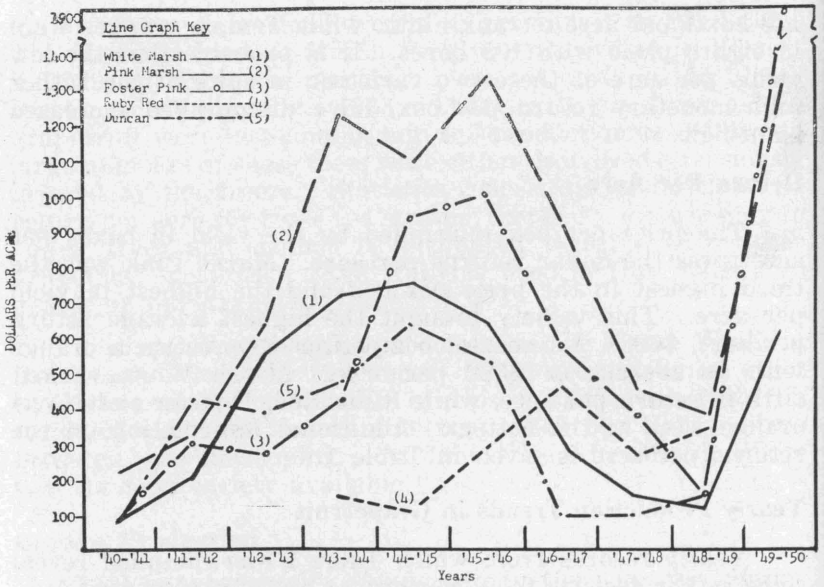

Figure 1. Yearly return per acre in dollars for five varieties of grapefruit, 1940-50.

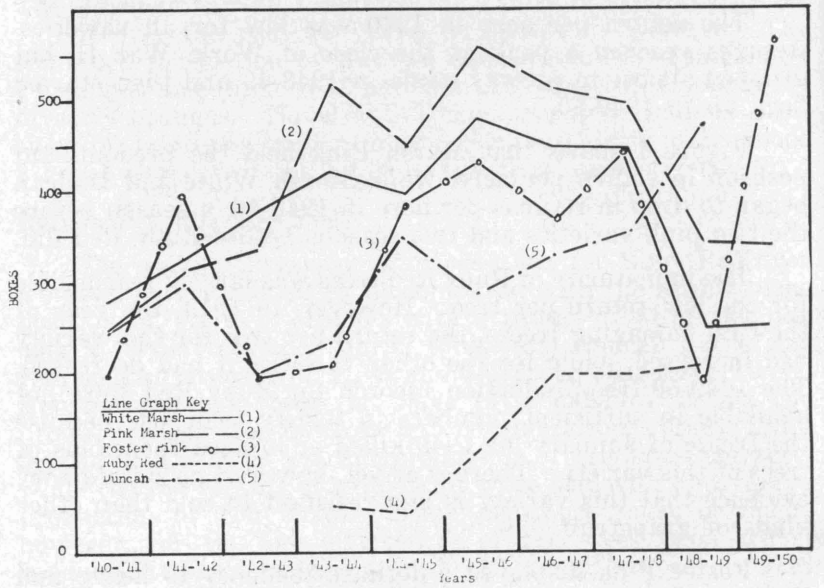

Figure 2. Yearly production per acre in boxes for five varieties of grapefruit, 1940-50.

characteristic, and it is probable that this factor, along with its seediness, has been instrumental in this variety becoming of minor importance.

Yearly Production Trends in Oranges

Grower prices per box and yield per acre for each variety of orange over a 10-year period are shown in Figures 3 and 4, respectively. Valencia returned more money per acre and maintained a much higher yield than any other variety. The 1949 freeze was largely responsible for reducing the Valencia crop for that and the succeeding season, as shown in Figure 4. Since most of the Valley Valencias are usually harvested after February 1, the bulk of the fruit was on the trees when the freeze occurred. A large portion of the crop became worthless, and the remainder brought low prices. The price was satisfactory the following year, but the trees were still recovering from the effects of the freeze and production was low.

On the whole, production per acre for each variety of orange remained much more stable than that of grapefruit. Navel brought a firm price but the yield is so low that the returns per acre suffer by comparison with the other orange varieties, as shown in Figure 3. Pineapple had the highest average production per acre and, during the early years of World War II, returns per acre equaled those of the Valencia. However, the demand for this variety fell off in 1944-45, as reflected in a lower price per box. The production and return per acre for Pineapple over the remaining years of the study were virtually the same as those of the Hamlin. This confirms the general feeling among Valley growers that there is little to choose between these two varieties.

The difficulties in handling the Temple orange, together with its poor yields, have kept its production to less than 5 percent of the orange crop of the past 10 years. Experience has shown, however, that good prices to growers are obtained when this variety is carefully handled. Recently, the Temple and the Navels have been much in demand by shippers of gift fruit.

No satisfactory records were available on Marrs Early and Jaffa oranges. A 3-year record of a young planting of Jaffas gave an average of two boxes per tree. The 1949 freeze caused no apparent reduction in yield for that or the following year, and there is some indication that this variety came through the 1951 freeze in better condition than most other orange varieties.

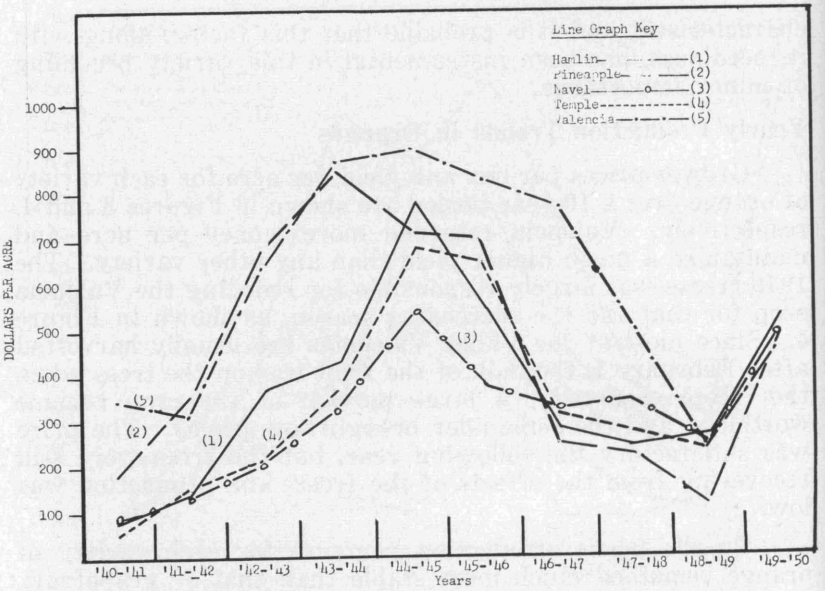

Figure 3. Yearly return per acre in dollars for five varieties of oranges, 1940-50.

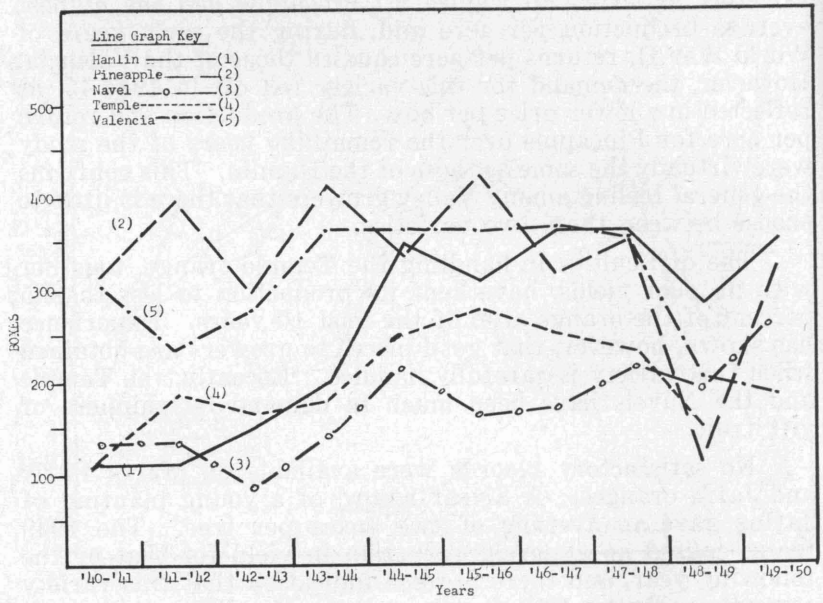

Figure 4. Yearly production per acre in boxes for five varieties of oranges, 1940-50.

Production Per Tree—All Varieties

Figure 5 shows another side of the citrus story of importance in future development. This chart gives the average yearly yields per acre for all varieties of grapefruit and oranges. Of significance is the fact that the yield per tree of all citrus increased during the war and then remained at this high level. This additional productivity was brought about largely through improved cultural practices. Grapefruit gained three boxes per tree and oranges about a box and a half.

Seasonal fluctuations of grapefruit varied more widely than those of oranges, suggesting greater tolerance to climatic changes in oranges than in grapefruit. The direction of fluctuations from year to year was the same for both oranges and grapefruit. Application of efficient orchard management practices instigated at the beginning of World War II resulted in better all-around tree performance, and enabled the growers to better combat rising costs of production.

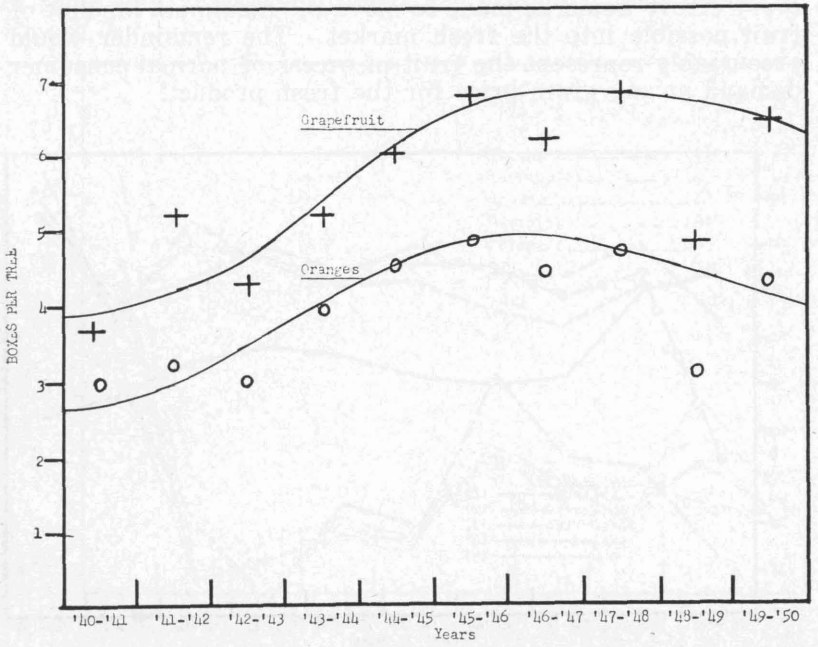

Figure 5. Yearly production per tree in boxes of all grapefruit and orange varieties, 1940-50.

Fresh and Processed Production—Grapefruit

The proportion of fresh to processed fruit for a given variety has often been used as a guide in judging its worth. The percentages of fruit packed for the fresh market for each variety of grapefruit over a period of 10 years are shown in Figure 6. The difference between the percentage for the fresh market fruit and 100 percent is assumed to represent the percentage of total production per variety processed. This does not take into account the quantity of fruit which may have been left in the orchards or discarded at the packing plant, which is relatively small. Marsh White showed a sharp decline in percentage of packed-out fruit—from 72 to 51 percent—between 1940 and 1944. This may have been due in part to an increase in total production of this variety of from 10 to 13.75 million boxes. The pink-meated varieties showed a gradual increase in the percentage of fruit packed for the market, as well as an increase in total production.

Since the return to the grower is generally greater for fruit sold on the fresh market than for that sold for juice, every effort would be made to move the maximum amount of fruit possible into the fresh market. The remainder would presumably represent the fruit in excess of normal consumer demand at any given price for the fresh product.

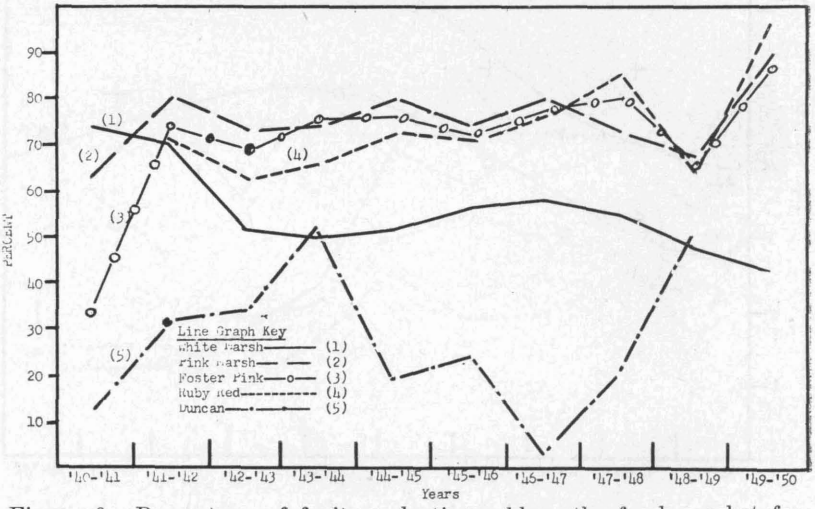

Figure 6. Percentage of fruit production sold on the fresh market for each of five varieties of grapefruit, 1940-50.

The increase in total production of Marsh White resulted in a surplus of fruit which could not be absorbed even by the increasing consumer demand for citrus, while the increase in total production of pink-meated varieties was not enough to keep pace with consumer demand. This created a favorable situation for growers with such varieties as Ruby Red, Marsh Pink and even Foster Pink, but posed a rather serious problem for those with Marsh White and Duncan.

Fresh and Processed Production—Oranges

The orange situation is more stable than that of grapefruit. This may be due to the relatively small quantity of oranges produced in the Valley and to the fact that the production per variety is more evenly distributed than in grapefruit. There has been little difficulty in disposing of the bulk of the crop through fresh fruit channels since 1940-41. An average of nearly 93 percent of the crop during the war years and approximately 80 percent during 1945-50 was sold on the fresh fruit market. In contrast to grapefruit, there was very little difference among orange varieties in the proportions of fresh and processed fruit. The 10-year trends of fresh and processed oranges are presented graphically in Figure 7.

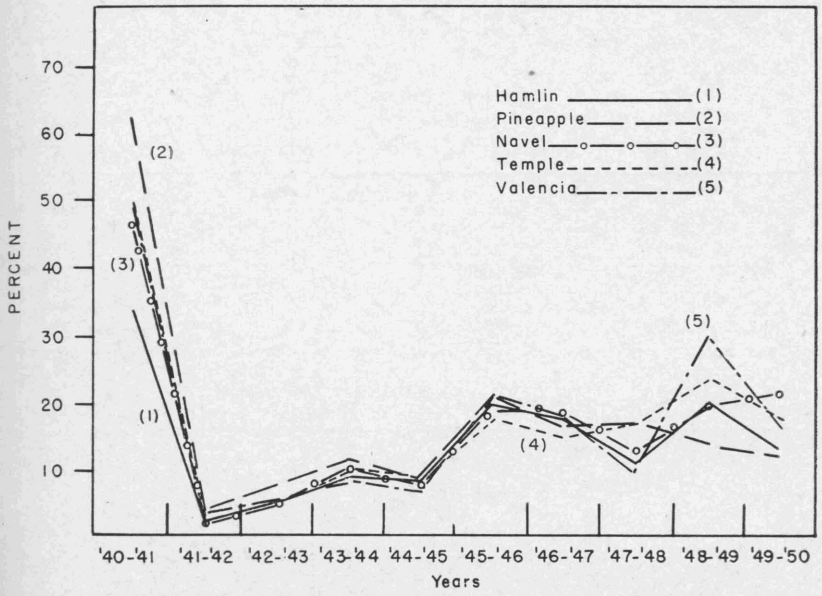

Figure 7. Percentage of fruit production sold as juice for each of five varieties of oranges from 1940-50.

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MORE DETAILS AVAILABLE

Detailed price information used in preparing Table 1 and the seven figures in this publication are available in a separate mimeographed report. Copies of these tables may be obtained from the Lower Rio Grande Valley Experiment Station, Weslaco, Texas.